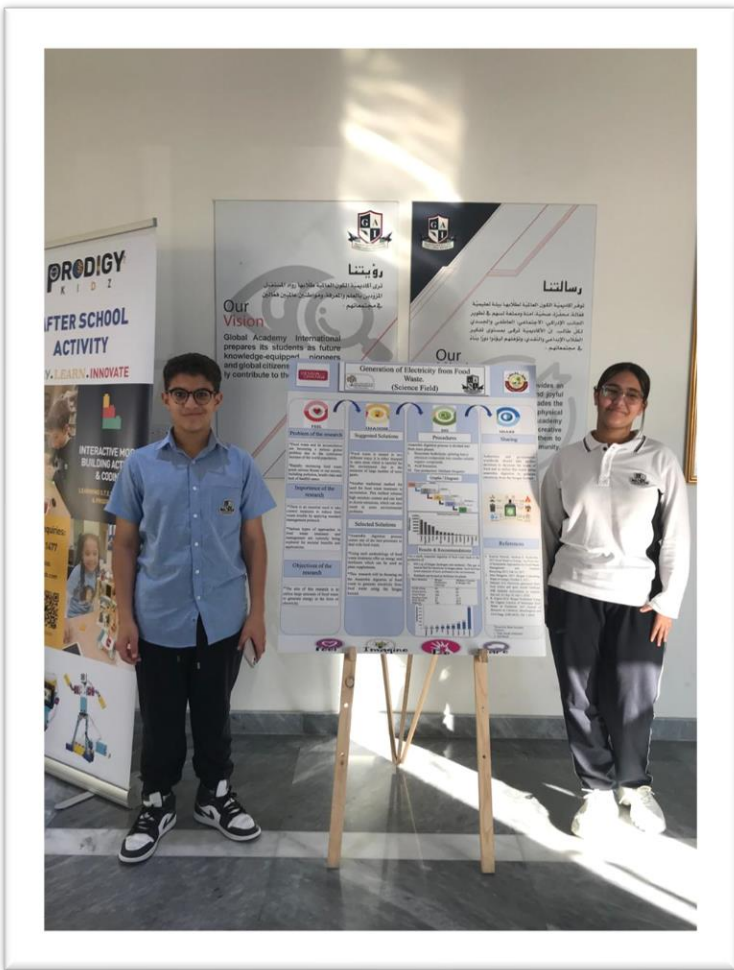




VISION
Global Academy International regards its students as future knowledge-equipped pioneers and global citizens who effectively contribute to their societies.

MISSION
Global Academy International provides an effective, caring, healthy, safe, and joyful educational environment that upgrades the cognitive, social, emotional, and physical wellbeing of each student. Global Academy International promotes students' creative and critical thinking and prepares them to play a constructive role in their community.

المسابقة	عدد الطلاب
Design For Change (Academic Year 2023-2024) Project: Phytoremediation of Wastewater Using Typha Angustifolia.	Two Students
Design For Change (Academic Year 2022-2023) Project: Generation of Electricity from Food Waste. Ranked in 2 nd place.	Two Students
Arab Code Week (Academic Year 2021-2022) Project: Al Karaana Lagoon Aeration System. Ranked in 2 nd place	Two Students



Generation of Electricity from Food Waste. (Science Field)

FEEL

Problem of the research

*Food waste and its accumulation are becoming a serious global problem due to the continuous increase of the world population.

*Rapidly increasing food waste poses serious threats to our society, including pollution, health risks and lack of landfill space.

Importance of the research

*There is an essential need to take correct measures to reduce food waste trouble by applying standard management protocol.

*Various types of approaches in food waste treatment and management are currently being explored for societal benefits and applications.

Objectives of the research

*The aim of this research is to utilize large amounts of food waste to generate energy in the form of electricity.

IMAGINE

Suggested Solutions

*Food waste is treated in two different ways; it is either dumped in open areas which is harmful for the environment due to the emission of large number of toxic gases.

*Another traditional method for food waste treatment is incineration. This method releases high moisture content and can lead to dioxin emissions, which can also result in some environmental problems.

Selected Solutions

*Anaerobic digestion process comes one of the best processes to deal with food waste.

*Using such methodology of food waste treatment offer us energy and fertilizers which can be used as plant supplements.

*This research will be focusing on the Anaerobic digestion of food waste to generate electricity from food waste using the biogas formed.

DO

Procedures

Anaerobic digestion process is divided into three main phases:

- I. Enzymatic hydrolysis: splitting heavy chemical compounds into smaller soluble organic compounds.
- II. Acid formation.
- III. Gas production: Methane biogases.

Graphs / Diagram

Results & Recommendations

*As a result, Anaerobic digestion of food waste leads to the production of:

1. 850 L/g of biogas (hydrogen and methane). This gas is used as fuel for electricity in biogas plants. Such fuel has lower emission of toxic pollutant to the environment.
2. Residuals can be used as fertilizers for plants.

Raw Material	Biogas Production (L/m ³)	Methane Content in Biogas (%)
Cattle Slurry	40	60
Croton leaves	100	65
Food Waste	160	62
Manure (Dust)	5.5	71.5
Food Waste	75	68.2
Manure	350	59.7

SHARE

Sharing

Authorities and governments worldwide should take perfect decisions to decrease the waste of food and to utilize this waste using anaerobic digestion to generate electricity from the biogas formed.

References

1. Kewat Parthodi, Sandeep K. Kulkarni. 2017. Food Waste to Energy: An Overview of Sustainable Approaches for Food Waste Management and Nation Recycling. 2017, Feb 14, 2017.
2. Sara Tanigawa. 2017. Biogas: Converting Waste to Energy. October 3, 2017.
3. Dabous, S.O. Electricity generation from food wastes and spent animal bedding with nutrient recirculation in anolytic fuel cell. Sci Rep 10, July 1, 2020.
4. E. Kigami. 2014. Biogas Production Using the Organic Fraction of Municipal Solid Waste as Feedstock. Int J Journal of Research in Chemical, Metallurgical and Civil Engg. (IJRCMCE), Vol. 1, 2014.

*Researcher: Rand Alshamsi
*Student:
1. Omar Ahmad Alshamsi
2. Jafar Dawad



VISION
Global Academy International regards its students as future knowledge-equipped pioneers and global citizens who effectively contribute to their societies.

MISSION
Global Academy International provides an effective, caring, healthy, safe, and joyful educational environment that upgrades the cognitive, social, emotional, and physical wellbeing of each student. Global Academy International promotes students' creative and critical thinking and prepares them to play a constructive role in their community.

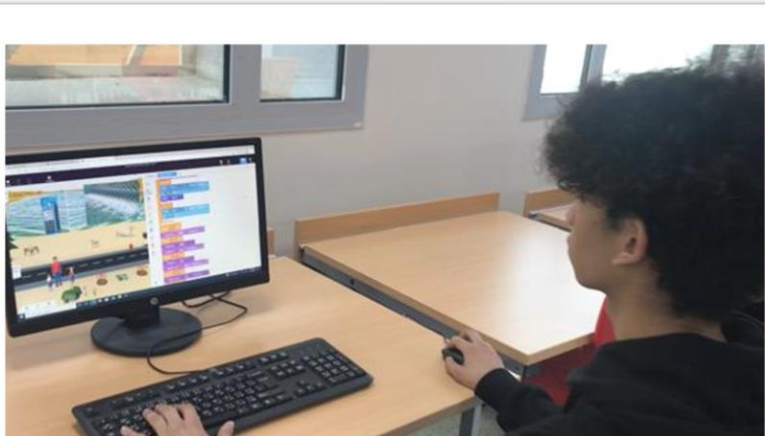


School Name أكاديمية الكون العالمية - معيزر - مدارس الخاصة المدرسة
 Stage أكاديمية الكون العالمية - معيزر المرحلة
 Language إنجليزي لغة المشروع
 Main Spec علوم التخصص الرئيسي
 Sub Spec التخصص الفرعي
 Class بحث علمي التصنيف
 Shortcut الاختصار

Generation of Electricity From Food Waste

نوع المشاركة	إسم المشارك
مشرف البحث	رائد شادي ابو ترابي
طالب مشارك	جودي احمد فؤاد احمد داود
طالب مشارك	عمر وائل احمد عبداللطيف محمد

2023 - 2022



Phytoremediation of Wastewater Using Typha Angustifolia. (Science Field)

feel

Problem of the research

Water pollution is increasing throughout the water cycle. Due to population growth, accelerated urbanization and economic development, the quantity of wastewater being generated, and its overall pollution load are increasing globally.

Importance of the research

There is an essential need to take correct measures to treat wastewater by applying standard management protocol.

Various types of approaches in wastewater treatment and management are currently being explored for societal benefits and applications.

Hypothesis

What is our role as scientific researchers? Should we take serious actions for water treatment? Is Typha angustifolia effective in a phytoremediation process?

Objectives of the research

The aim of this research is to use the Typha Angustifolia plant in a phytoremediation process to eliminate Manganese metals from wastewater.


Imagine

Suggested Solutions

Various techniques or methodologies for eliminating these contaminants (heavy metals) from wastewater have been developed and used. The expense of implementing these strategies is the issue. Additionally, these methods have certain side effects, such as high energy requirements, insufficient removal, or the creation of toxic sludge which are very harmful to the environment and need special treatment.

Selected Solutions

Our research will be focusing on phytoremediation which has been promoted as an inexpensive, environmentally friendly, and sustainable method for eliminating a variety of recalcitrant contaminants, including heavy metals, organic pollutants, and micro-bacterial toxins, using the plant Typha angustifolia. Using this plant, we aim to remove Manganese metal known as heavy metal from wastewater.



Do

Procedures

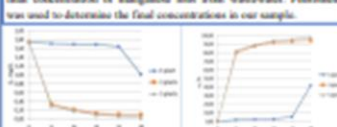
One, three, and five specimens of Typha angustifolia, the narrowleaf cattail utilized to extract manganese ions from artificial wastewater were employed in these tests. The solutions were stirred for 40 hours and samples were taken every 8 hours. These experiments were performed at room temperature.

Graphs / Diagram

Number of Typha-angustifolia plants	Manganese (mg/L)		
	Initial	Final	Removal efficiency
1 plant	1	1.74	1.00
	2	1.17	1.25
	3	1.15	1.28
	4	1.08	1.07
	5	1.08	1.17
3 plants	1	1.15	1.00
	2	1.08	1.00
	3	1.12	1.00
	4	1.12	1.00
	5	1.12	1.00
5 plants	1	1.15	1.00
	2	1.12	1.00
	3	1.12	1.00
	4	1.12	1.00
	5	1.12	1.00

Results & Recommendations

As a result, following calculation formula was used: $\eta = \frac{C_0 - C_t}{C_0} \times 100$, where η represent the treatment efficiency, C_0 represent the initial concentration of manganese ions from wastewater, C_t represent the final concentration of manganese ions from wastewater. Photometer was used to determine the final concentrations in our sample.



The results indicated that throughout the experiments of the 40-hour period, the concentration of manganese ions gradually decreased, indicating that Typha angustifolia is effective in removing this heavy metal from wastewater. In the first set of studies, where the starting concentration of Mn (II) ions was 1.74 mg/L, the yields were 41.93% using one plant, 94.23% using three plants, and 89.28% using five plants in the water treatment process. The residual manganese metals can be regenerated and be used again.





Share

It is very important to spread awareness of wastewater occurring worldwide, which is generally increasing annually. Thus authorities and government worldwide should take perfect decisions to decrease wastewater and reduce the water scarcity which is becoming a major issue in regenerating back the heavy metal from wastewater in which it can be reused in several ways.

References

1. Brown, R. K.; Habib, M. A.; Karim, A. K.; Tahir, S. (2018). Recovery of manganese and zinc from waste Zn-C cell powder: Mutual separation of Mn (II) and Zn (II) from leach liquor by solvent extraction technique. Waste Management, 51, 149-156.
2. Kaur, M.; Tripathi, B. D., (2015). Effect of Phytoremediation and Typha latifolia on Bio-Elimination of heavy metals from secondary treated effluent. International Journal of Environmental Science and Technology, 12, 3029-3034.
3. Anuj, C. S. T.; Carvalho D. C.; Razzulo R. C.; Almeida L. L. S.; Coelho L. M.; Coelho N. M.; Marques T. L.; Alves V. N. "Biorremediation of Wastewater Contaminated with Heavy Metals Using Moringa oleifera Seeds as Biosorbent". Applied Bioremediation - Active and Passive Approaches, 2013.
4. APHA, 2005. American Public Health Association Standard Method for Examination of Water and Wastewater, 21st ed. APHA, Washington, USA.

*Scientific Research Coordinator: Saad Alsharabi
 *Students:
 1. Joudi Salem,
 2. Jafar Dawood



VISION

Global Academy International regards its students as future knowledge-equipped pioneers and global citizens who effectively contribute to their societies.

MISSION

Global Academy International provides an effective, caring, healthy, safe, and joyful educational environment that upgrades the cognitive, social, emotional, and physical wellbeing of each student. Global Academy International promotes students' creative and critical thinking and prepares them to play a constructive role in their community.

شهادة إنجاز نشاط

أسندت هذه الشهادة للسيد(ة):
رائد شادي ابوترايبي

للإنجاز(ة) نشاط :
System Aeration lagoon karaana AI

التاريخ : 2022/02/21

مركز الشهادة
18855873MJ

موقع الويب : <https://arabcodeweek.alecso.org>
صفحة الفيسبوك : www.facebook.com/arabcodeweek

EDU
تعليم مستدام

تهانينا

يسر إدارة الاسبوع العربي للبرمجة
تهنئة المعلمين الفائزين بمسابقة النشاط الذهبي
بدولة قطر

1 محسم لإنقاذ حيوان الباندا
إيناس خديري

2 Al Karaana Lagoon Aeration System
رائد شادي ابوترايبي

3 إنشاء محمية حيوانات
نهال طاهر حافظ

4 تنظيف الشواطئ باستخدام برنامج سكراتش
سمر السيد رمضان راشد

5 بطاقات توعوية لحماية البيئة في الوطن العربي
هبة العمري

6 تصميم بوابر تعمل بالطاقة المائية لتخفيف من التلوث
المائي بالمناخرافات / هاجر محمد زكي أسعد

7 حول النظام Scratch لتطبيق باستخدام البرمجة
ايه بسام علاونه

8 استضافة خبير في توظيف الذكاء الاصطناعي في الروبوت
نسرين ماجد صالح السويطي

9 تصميم فرقة مرورية هديفة للبيئة و توظيف الروبوت داخلها
الأزهر بن الطاهر الزاردي

10 تفعيل قيمة الهوية الوطنية
رفقة صلاح الدين عيسى

تهانينا

يسر إدارة الاسبوع العربي للبرمجة
تهنئة المدارس الفائزة بمسابقة المدرسة الذهبية
بدولة قطر

1 مدرسة
الخنساء الابتدائية للبنات

2 مدرسة
الوفاء النموذجية للبنين

3 اكااديمية
الكون العالمية